2002 CleanEnergy Seminar, Sacramento.

Dr. Bernd Gebler

From Research into Series Production

BMW Group

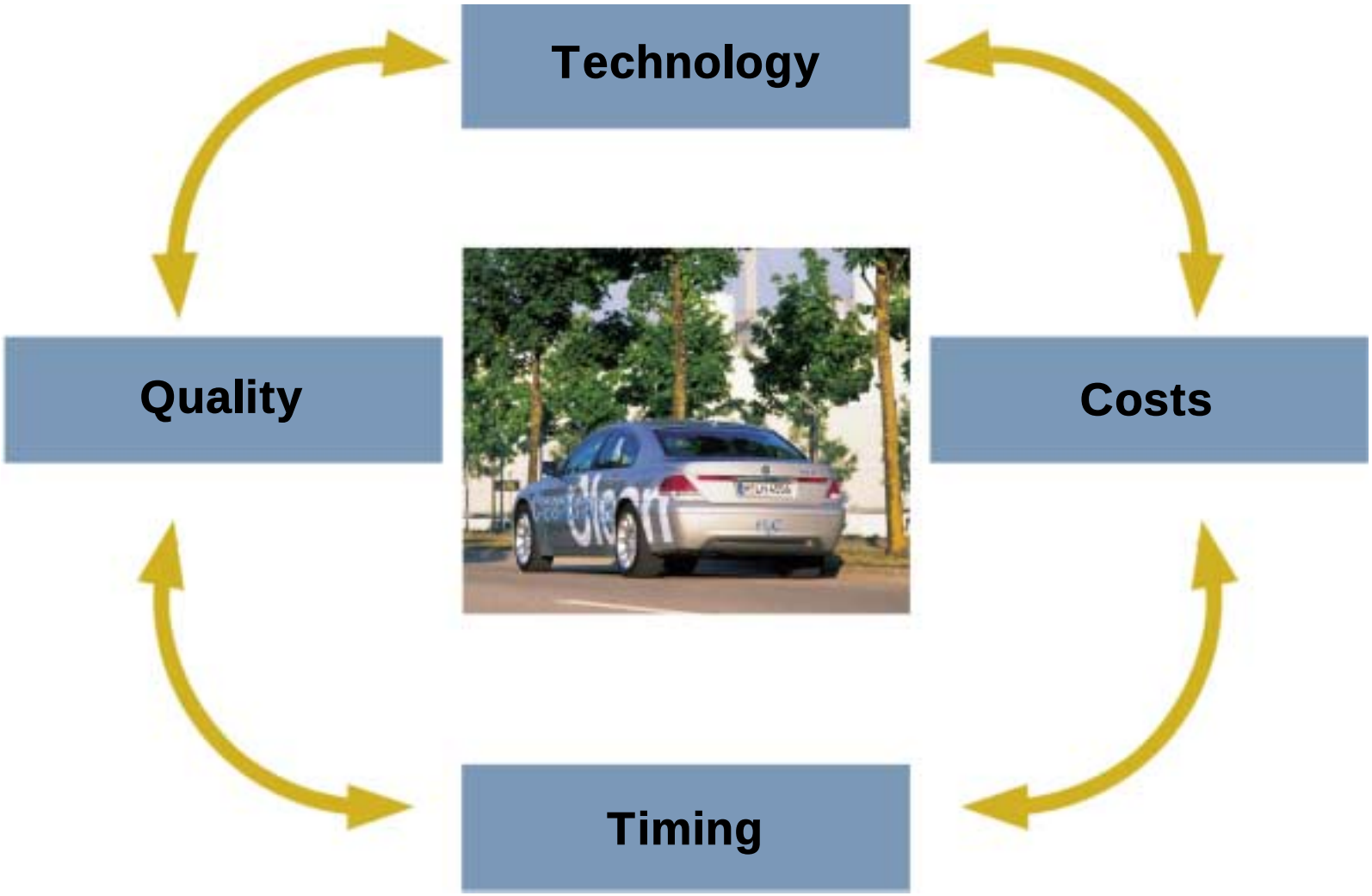
Process of Industrialization.
Production – Distribution – Utilization.

- **Production and distribution of hydrogen**

- **Comprehensive filling station network for hydrogen**

- **Vehicle technology suitable for daily use**

CleanEnergy.
Series Development.



Hydrogen Vehicle 760h.

LH_2-
storage system

Tank
control

Transmission

Transmission
control

Ignition system

"Hydrogenation"
H_2 mixture formation

Exhaust after treatment

DME

APU

APU
control

BMW
breakdown service

SDS

Vehicle
controls

Gas sensor
system

Display/
operating concept

Hydrogen Vehicle.
Challenges in Infrastructure.

Filling Station

Parking,
Garaging

Tunnels

Vehicle
licensing

Data Transmission

Emergency
Services

Accidents

Repairs/maintenance

Service

CleanEnergy.
Functionality and Efficiency.

- **Functionality under all road/ climate conditions**
- **Appropriate service intervals**
- **Competitive full-package costs compared to conventional petrol and diesel vehicles**

CleanEnergy.

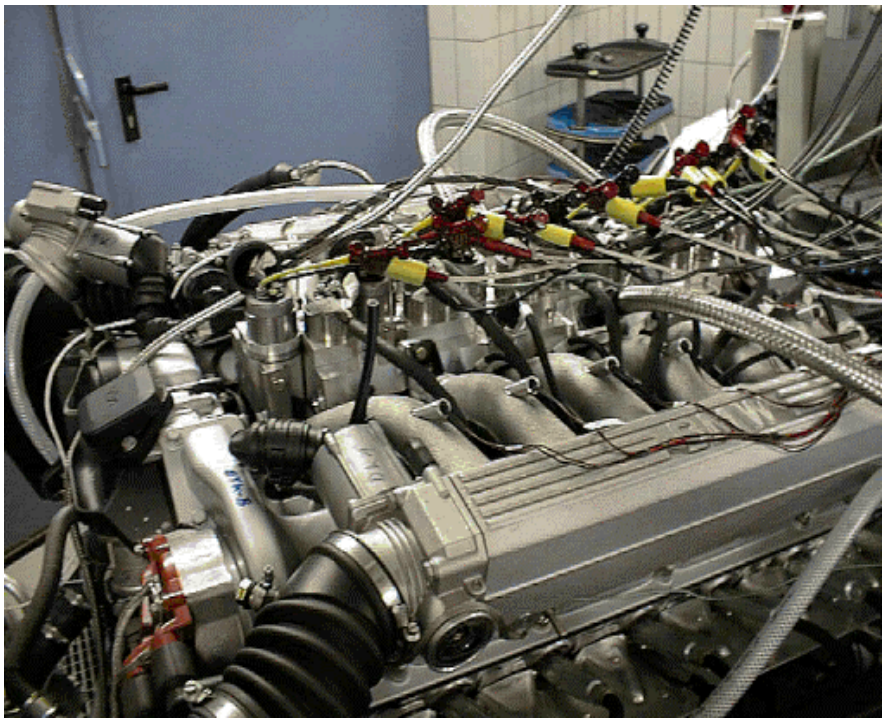
Sixth Generation of Hydrogen Vehicle.

CleanEnergy.
Specifications of the 760h.

Cylinders	V12	
Fuel	LH_2 / Petrol	
Displacement	6,0 l	
Power	155 kW	
Torque	340 Nm	
V_{max}	226 km/h	
Storage	LH_2	170 l
Capacity	Petrol	78 l
Range	LH_2	300 km
	Petrol	+550 km
Auxiliary Power Unit	5 kW /42 V-Fuel-Cell APU, H_2-SOFC	

CleanEnergy.

Current Status: 760h Powertrain.



- V12 / 6,0 L
- Power 155 KW
- Torque 340 Nm
- External carburetion
  ➔„hydrogenation“
- Injection valves
- Lean operation
- Bivalent (H_2/petrol)
- NO_x treatment

CleanEnergy.

Current Status: 760h Storage System.

- Cylindrical storage / 170L
- Super insulation
- Fuel level indicator
- Valves
- Heat exchanger
- Boil-off management system
- Automotive refuelling tank coupling (standardization)
- Manufacturing feasibility

CleanEnergy.

Manual Production of the LH_2 Storage System.

CleanEnergy.

Integrated H_2Fuel Cell as APU.

- 5 kW / 42 V
- Engine does not need to propel auxiliary units
- load balance
- New comfort features

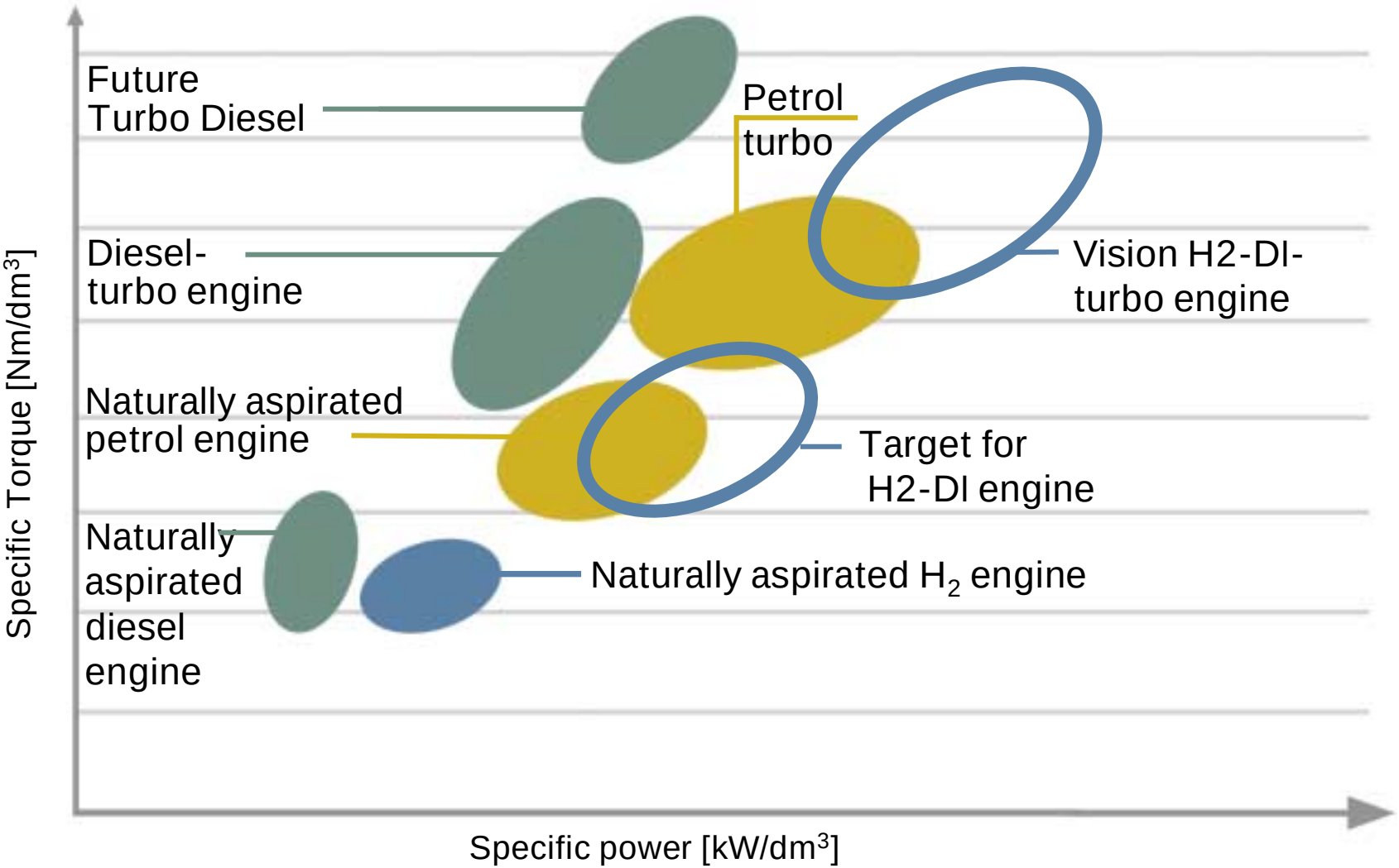
Hydrogen Purpose Design.

Vehicle Concept, Package Study.

- Vehicle integration
- Reduction of Boil-off
- Internal carburetion/hydrogenation
- Increasing of torque and power
- Free shaped tank, structural design tank
- Emissions Reduction
- „boil-off“ utilization

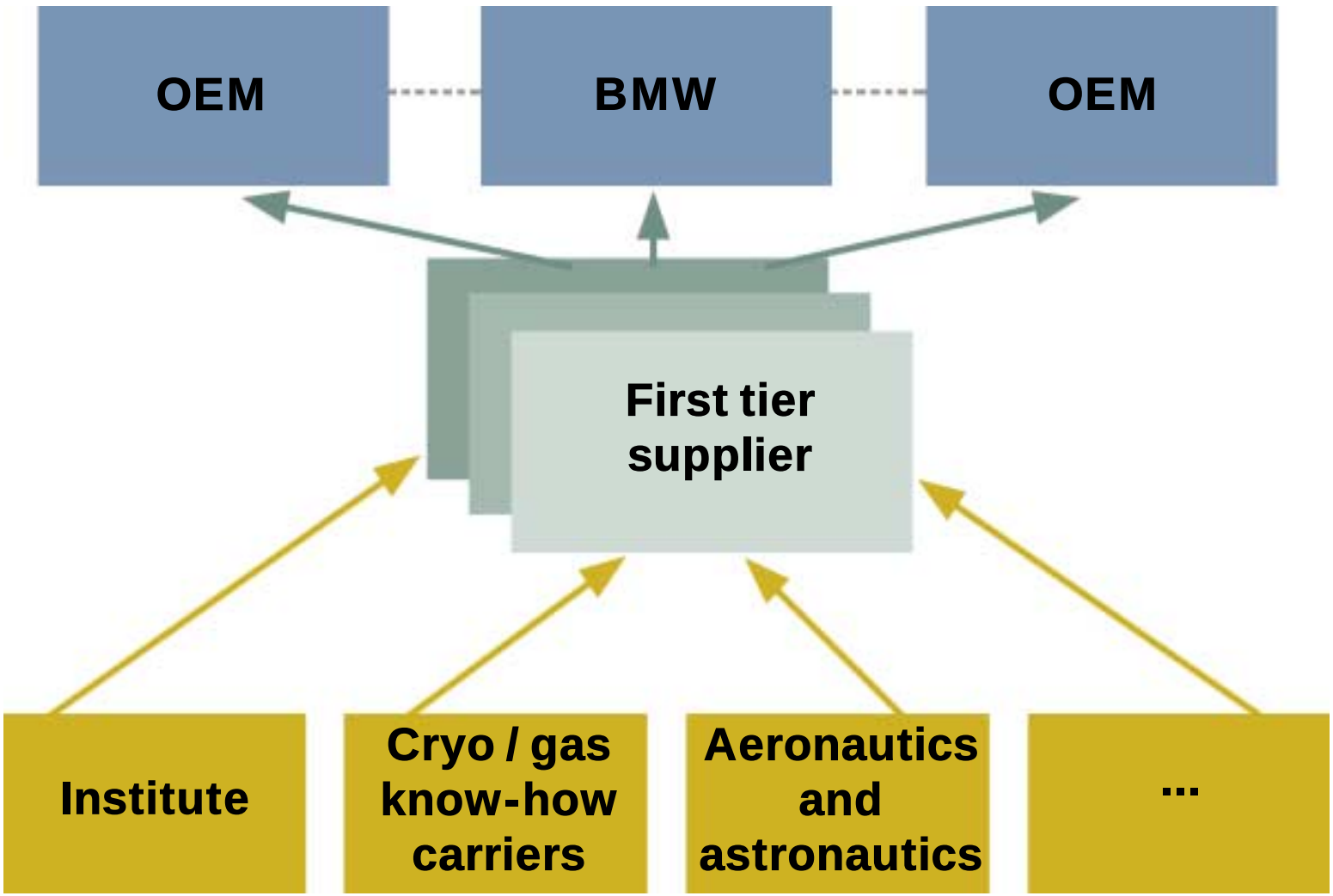
Hydrogen Powertrain.

Power/Weight Ratio in Comparison.



Development Cooperations.

Series Development of H_2 Components.



CleanEnergy.

It‘s up to us to make it happen!

CleanEnergy.
Driving the Future.

Besser Mit Wasserstoff


Was bewegt uns morgen?
What will move us tomorrow?